

RTP Leaders Unite to Advance Environmental Health

When North Carolina's Research Triangle Foundation provided 509 acres of land to the U.S. Surgeon General's Office in 1967 as the site for the newly established Division of Environmental Health Sciences, the area was probably not foreseen as a hub for companies, institutions, and government agencies working on issues related to environmental health. Then, just two years later, the Division of Environmental Health Sciences was elevated to institute status to form the NIEHS. Since that time, the area now known as Research Triangle Park (RTP) has expanded into a nucleus of intellectual activity in environmental health sciences that includes the National Toxicology Program, the laboratories of the U.S. EPA, the CIIT Centers for Health Research, and environmental research programs at Duke University, the University of North Carolina–Chapel Hill, and North Carolina State University, among other institutions and nonprofit organizations.

These organizations are now taking advantage of a unique opportunity to solidify RTP's reputation as the epicenter for environmental health science research in the United States by creating a forum for discussion and debate of the important public health issues related to environment and health. Prominent individuals in the RTP community—including former North Carolina governor James Hunt, former NIEHS director Kenneth Olden, and William Roper, chief executive officer of the North Carolina Health Care System and former head of the CDC—have been working to bring thought leaders together on these issues in a new initiative that has been dubbed the Research Triangle Environmental Health Collaborative.

The mission of the collaborative is to connect organizations and institutions; link research and policy; and join government, academia, industry, and public interest groups for the purpose of mutually considering, discussing, and debating the grand challenges in environmental health at the regional, national, and international levels. Says Olden, "When I came to the NIEHS many years ago, I realized the talent base we have here in RTP. The major environmental health research institutions

for Constella Group, a professional health consulting service that is facilitating the effort with support from the NIEHS, the collaborative has applied for nonprofit 501(c)(3) status. "Once created, the collaborative will provide those in government, academia, and the private sector with a neutral forum to host candid discussions and to provide advice on the most significant issues facing environmental health and related public policy," says Brown.

"Constella is proud to work with the NIEHS and other organizations and be at the genesis of creating a forum to discuss exciting, groundbreaking issues in environmental health," says Donald A. Holzworth, Constella Group's chairman and CEO. "By articulating this vision for a public-private partnership focused on environmental health, we have a unique opportunity to participate in creating a global forum to build awareness and education around these critical issues."

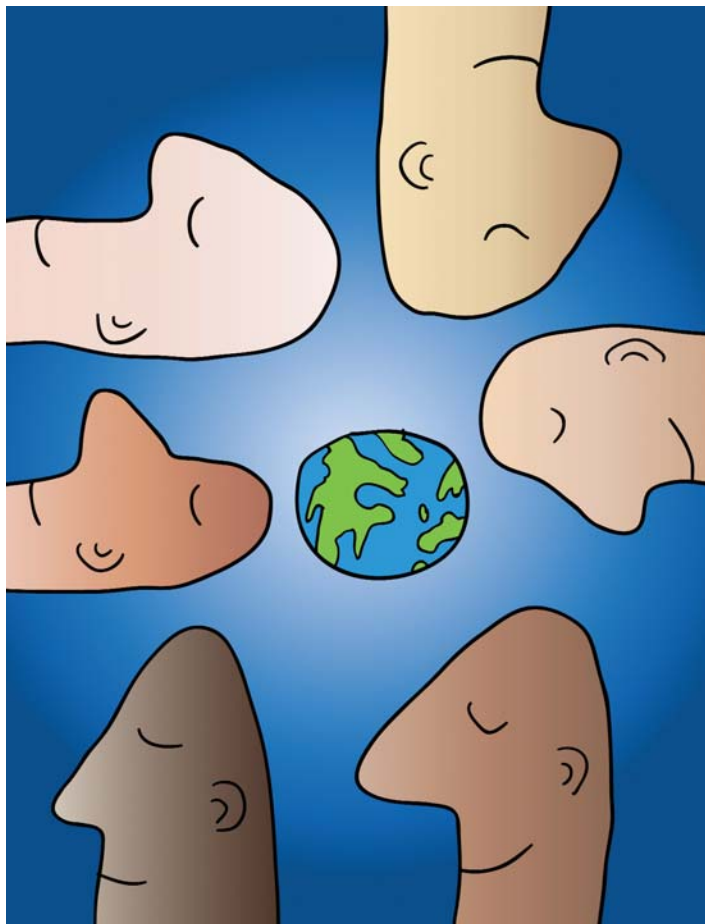
Olden chairs the collaborative's Executive Committee, which currently comprises representatives from academia and the private sector. The other members include William Greenlee, president and CEO of the CIIT Centers for Health Research; David Hinton, Nicholas Professor of Environmental Quality at Duke University's Nicholas School of the Environment and Earth Sciences; Ernest Hodgson, a professor of environmental and molecular toxicology at North Carolina State University; Rich Cohn, vice president of

the Center for Health Research at Constella Group; and Edward Baker, director of the Institute for Public Health at the University of North Carolina–Chapel Hill.

Committee members hope that leaders of nonprofit organizations and public interest groups in RTP will join the collaborative as well.

A First Step

The collaborative has already received \$30,000 in initial funding from the NIEHS to host its first Environmental Health Summit, planned for the spring of



are all here, the intellectual resources of the major research universities, and also the companies that have evolved around this. No place else in the world can boast this concentration of minds working on environmental public health issues. So we thought that it follows that if you can help to focus these talents in the areas where perhaps the most change can be effected, real progress might be made."

An Idea Made Real

According to David P. Brown, director of scientific research program development

2007 in RTP. This meeting will bring together environmental and public health leaders from around the world to identify today's foremost environmental health challenges. Participants, who may include former EPA administrators Carol Browner and William Reilly, will also seek to address these challenges from a solution-oriented perspective, emphasizing research needs, policy changes, education, and prevention/intervention programs.

The Environmental Health Summit is just one activity through which the collaborative plans to address important issues. The collaborative will help facilitate the goals of the NIEHS and the EPA by organizing meetings, helping to attract new scientists, and serving as a clearinghouse for environmental health science-related activities and events in the RTP area. The collaborative may also provide expert advice and review as well as a neutral forum for discussions on science and policy.

Other activities will include promoting RTP as a desirable scientific, research, and business destination in an effort to lure more environmental health science organizations to the area, as well as supporting the convergence of government, academia, and non-profit interests to generate an attractive economic environment for business growth for private companies. The group will showcase academic institutions' key environmental programs, including those supported by the federal government, and will facilitate interaction between academia, government, nonprofit foundations, public interest groups, and private organizations in a collegial environment. The collaborative also plans to facilitate multi-partner efforts in grant development to generate new research programs. Finally, the collaborative will serve as an interorganizational think tank comprising environmental, health, and policy leaders from associations, foundations, and nonprofit organizations.

For additional information about the collaborative, please contact David Brown at dabrown@constellagroup.com.
—Luz Claudio

BEYOND THE BENCH

An Integrative Curriculum: Science by Design

With our increased awareness of the need to understand human–environment interactions, it is more critical than ever to spark and nourish children's interest in science. Now an NIEHS-sponsored program at the Baylor College of Medicine Center for Educational Outreach is responding to this educational challenge by offering the ECOS (Environment as a Context for Opportunities in Schools) project, a teacher professional development and curriculum implementation project with an integrative approach that focuses on strengthening science teaching and learning at the elementary school level.

Established in 2000, the ECOS project was created by a team of educators, scien-

“My World and Me,” the module developed for students in grades K–2, contains two units, “Living Things and Their Needs” and “Resources and the Environment,” each with 10 sequential series of lessons, an illustrated storybook for each student that teaches science and health concepts while relating the adventures of Tillena Lou Turtle, and a “read aloud” big book for classroom use. An accompanying teacher's guide to hands-on activities stresses inquiry-based lessons such as observing an



Teaching the teachers. ECOS participants learn to implement curricula that examine topics such as the processes involved in creating everyday objects from natural resources (large photo) and the physical properties of water (inset).

tists, and health specialists to connect environmental health science with health, reading/language arts, mathematics, and social studies for Houston-area elementary schools. Two distinct educational series for grades K–2 and 3–5, developed previously with funding from the NIEHS and the National Center for Research Resources, were first implemented in six schools. Later, a charter school and four more elementary schools were added to the project. Both series of curriculum materials include interactive class lessons and engaging adventure storybooks illustrated by T. Lewis, co-creator of the syndicated comic strip and animated movie *Over the Hedge*.

earthworm, identifying its needs, and building an appropriate habitat in a terrarium made of a plastic soda bottle.

The “My World” (formerly “My Health, My World”) series has four units on integrative topics for students in grades 3–5: “Air,” “Water,” “Global Resources,” and “Food.” Each unit includes a storybook featuring the adventures of squirrels Riff and Rosie, an *Explorations* mini-

magazine for each student to share with family members, an activity guide for teachers, and supplements (for reading/language arts and mathematics) related to the storybook. Typical language arts activities include “finding the main idea” and writing about cause-and-effect relationships. Math activities focus on developing basic skills using science information related to a specific unit—for example, estimating metric measures, solving number puzzles, and creating and using graphs.

The program also provides support and training for teachers to help maximize the effectiveness of the curriculum. New teacher enrollees receive two days of professional

development including an overview of the curriculum content, a complete package of instructions, classroom activity kits, and training in conducting the different activities in the classroom units. Those already participating in the program receive additional training in enrichment activities scheduled several times throughout the academic year.

Both series are designed to be flexible and accommodate a variety of teaching methods and styles; the program designers note that schools have begun customizing unit activities to fit their own educational needs and priorities. Nancy Moreno, associate director of the Center for Educational Outreach and the ECOS project principal investigator, says customization shows that teachers are actively involved in the planning process for the project's implementation in their schools, and are intellectually invested in it. For example, she describes how the "Water" unit, initially designed for use in 2nd grade to meet science standards for that grade level, is now being used in 4th-grade classes in some schools because it better fits requirements for that grade level. "Since the materials are not grade level-specific, teachers can adjust them up or down by using suggestions and extensions that are provided in the teacher's guide," she explains.

ECOS project participation is also having a positive impact on overall science learning for both students and teachers. The program developers have measured student knowledge using tools such as pre- and post-tests and essay assignments, and have observed a noticeable increase in student performance, especially among Spanish-speaking students, at all grade levels. Participating teachers have also shown gains in content knowledge when taking similar types of assessments.

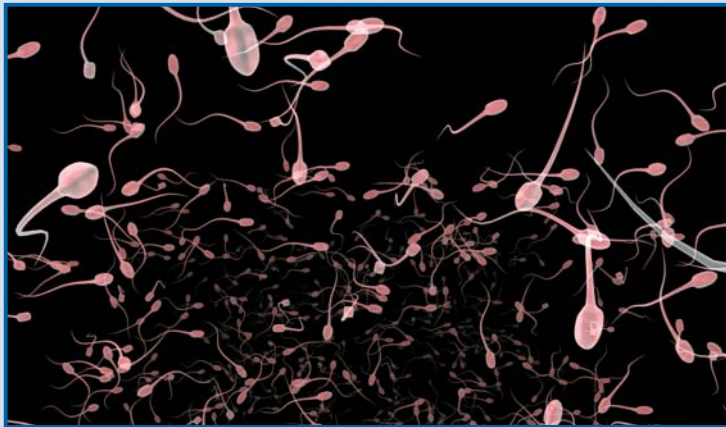
"The ECOS project is an example of how scientific research institutions can collaborate effectively with local schools to improve science teaching and learning," says Moreno. "Shortcuts do not work. However, when scientists, science educators, school administrators, and classroom teachers work together, the nature of science instruction received by students changes profoundly. The payoffs from this approach are beginning to be visible in the ECOS project."

More information on the project, including ordering information, is available at <http://www.ccit.bcm.tmc.edu/ceo/>. The project, which has received such honors as finalist status for the State of Texas Environmental Excellence Award, is developing new units to integrate science inquiry into schoolwork. Coming up in the next school year is a unit for 5th graders that focuses on alcohol as a chemical that can interact with the human body. **—Tanya Tillett**

Headliners

NIEHS-Supported Research

Reproductive Health



Sperm DNA Changes as Men Age

Wyrobek AJ, Eskenazi B, Young S, Arnheim N, Tiemann-Boege I, Jabs EW, et al. 2006. Advancing age has differential effects on DNA damage, chromatin integrity, gene mutations, and aneuploidies in sperm. *Proc Natl Acad Sci U S A* 103:9601–9606.

In the past several decades, more men and women have been postponing parenthood. Fatherhood among men aged 35–49 has increased 40%, while there has been a 20% decline in births fathered by men under age 30. Although it has long been accepted that women face reproductive challenges with age, the consequences of delaying fatherhood have been less understood. Now NIEHS grantees Andrew J. Wyrobek of Lawrence Livermore National Laboratory and Brenda Eskenazi of the University of California, Berkeley, School of Public Health, with their colleagues, have produced new research that suggests that, like women, men too have a "biological clock," but one that causes a more gradual change in fertility.

Obstetrician/gynecologists have known for quite a while that as women age, their risk of miscarriage increases, as does the risk of having children with Down syndrome or other genetic defects. Advanced paternal age has also been implicated in a range of reproductive and genetic abnormalities, from reduced fertility to some diseases of complex etiology such as schizophrenia. This research team has previously reported that as men age, their sperm counts decline and their sperm become less active. However, the mechanisms for the effect of older paternal age on genetic defects are not well understood.

In this study, the researchers analyzed the sperm of 97 men after an average of 5.1 days of sexual abstinence. The men were nonsmokers aged 22–80 who were in generally good health. The researchers used flow cytometry and statistical analysis to observe associations between a subject's age, his semen quality, and genomic abnormalities in his sperm such as DNA fragmentation, aneuploidy, diploidy, and mutations related to achondroplasia and Apert syndrome.

Increased age of the men was not associated with the same genetic defects seen in older women; for instance, there was no increased risk of fathering a child with Down syndrome. But some older fathers did have an increased risk of having children with achondroplasia, and according to the published results, "a small fraction of men are at increased risk for transmitting multiple genetic and chromosomal defects." The authors caution that their findings are preliminary and are based on a small number of tests in a small population of men. However, they believe their findings suggest that as men age, they may have more difficulty fathering children.

—Jerry Phelps